

FRIEDRICH et al., Ser. No. 09/235,242

step - -.

NE Claim 6, line 2 from the bottom, insert - - at from 50 to 250°C - -.

REMARKS

Claims 2 to 6 remain in this application.

Claim 6 has been amended to particularly point out the preferred temperature for the applicants hydrogenation step as disclosed at page 22, line 15 of the specification.

The examiner is requested to favorably reconsider the rejection of claims 2 to 6 under 37 U.S.C. 112, second paragraph in view of the foregoing amendment. Claims 2 to 5 are now dependent upon claim 6. Any confusion arising from claims 2 to 5 being dependent upon a canceled claim is regretted.

The examiner is respectfully requested to favorably reconsider the rejection of claims 2 to 6 under 35 U.S.C. 103(a) in view of the foregoing amendment and the following remarks. The applicants are no longer claiming a process for making a  $\beta$ -alkoxynitrile, as noted by the examiner at page 3 of the last office action. Original claim 6, now amended, was directed to a process for making a  $\gamma$ -alkoxyamine (gamma-alkoxyamine). Accordingly, the examiner's arguments with respect to the making of a  $\beta$ -alkoxynitrile are not relevant to the remaining issue of patentability. Among the documents cited by the examiner U.S. 5,196,589 (O'Lenick et al. is the closest prior art since it discloses the preparation of a  $\gamma$ -alkoxyamine by

(a) (first step) cyanoethylation of an alcohol in the presence of an alkaline catalyst, such as KOH, NaOH, NaOCH<sub>3</sub>, or an tetraalkylammoniumhydroxide and

(b) (second step) hydrogenation of the resulting  $\beta$ -alkoxynitrile in the presence of a hydrogenation catalyst (col. 4, lines 35-65, examples 1 and 10).

Corresponding to the examples 1 and 10 the yield of the  $\gamma$ -alkoxyamine is only 58.2 and 68.2% respectively.

O'Lenick is completely silent on the use of diazabicycloalkenes as catalysts.

This patent teaches that only if the 1,4-addition of an alcohol to acrylonitrile in the presence of an alkaline catalyst is performed in the additional presence of a stable free radical it "allows for the elimination of a washing step practiced in older processes, prior to hydrogenation." (col. 1, lines 53-56)

Sullivan et al. (U.S. 4,231,956 neither discloses a process for the preparation of  $\gamma$ -alkoxyamines nor a process for making the  $\beta$ -alkoxynitrile-intermediates.

Green (U.S. 4,617,154) teaches the use of diazabicycloalkenes for the 1,4-addition of alcohols to activated olefins, such as  $\alpha,\beta$ -unsaturated nitriles, to give  $\beta$ -alkoxynitriles as products.

This document does not disclose anything about the workup of the reaction products. All yields given in the examples are determined in the crude reaction products.

What is important, is the fact, that Green also teaches that the diazabicycloalkene-catalyst will also catalyze the breakdown of the product to give back the alcohol and the  $\alpha,\beta$ -unsaturated nitrile under the same conditions (elevated temperature) as employed for the additional reaction. (Col. 4, line 3 and lines 12-30 and example 14).

H.A. Bruson, Organic Reactions, Vol. 5, page 90, paragraph 3, lines 8-11 teaches that if a alkaline catalyst is used in the cyanoethylation of alcohols this catalyst must be destroyed before workup since the  $\beta$ -alkoxynitrile-product is readily dissociated (into the starting materials) by heat in the presence of the catalyst.

In the light of these teachings, a person of ordinary skill in the art would have expected a significant loss in yield if a hydrogenation of a crude  $\beta$ -alkoxynitrile (which is performed at elevated temperatures) in order to obtain the  $\gamma$ -alkoxyamine in high yields. (Compare our application, page 1, lines 31-41).

Of course, if one neutralizes the basic diazabicycloalkene 1 of our claims with an acid it is no longer a diazabicycloalkene but an amidinum-salt.

The underlying technical problem to be solved was to find a process for preparing a  $\gamma$ -alkoxyamine in high yield starting from an  $\alpha,\beta$ -unsaturated nitrile without there being any need for any prior costly removal or destruction or neutralization of the catalyst used for the 1,4-addition of an alcohol to the  $\alpha,\beta$ -

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unsaturated nitrile

This problem has been solved with our process according to claim 6. (Compare also page 21, lines 20-40 of our application).

Comparative example 5 is an example which adequately represents the closest prior art (U.S. 5,196,589 (O'Lenick et al.), col. 4, lines 35-65).

The yield of the desired  $\gamma$ -alkoxyamine in comparative example 5 was only 75% and is completely in line with the low yields according to O'Lenick et al. (examples 1 and 10).

The surprising advantages of our process are clearly a result of the combination of the technical features as claimed.

U.S. 4,617,154; U.S. 4,231,956 and U.S. 5,196,589 taken together do not give any hint how to solve the described technical problem with the claimed process.

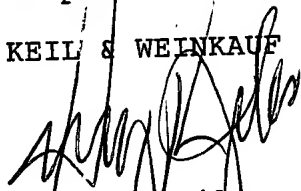
Therefore, the person skilled in the art would not have selected the features disclosed in these prior art documents in the manner claimed with the expectation to solve the described technical problem. For these reasons the claimed process is patentable over these documents. The unexpected difference in yield, 88 to 96.9% versus 75%, renders the process claimed herein unobvious. A Notice of Allowance is solicited.

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Respectfully submitted,

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